

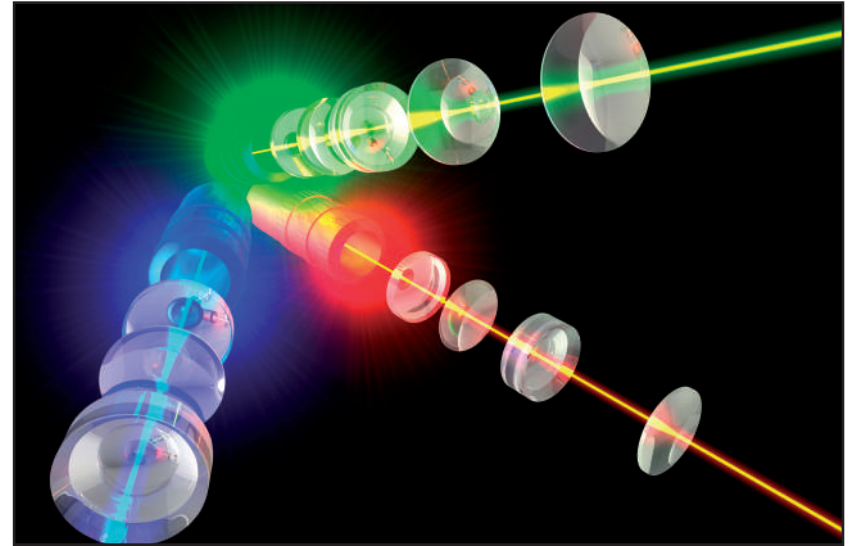
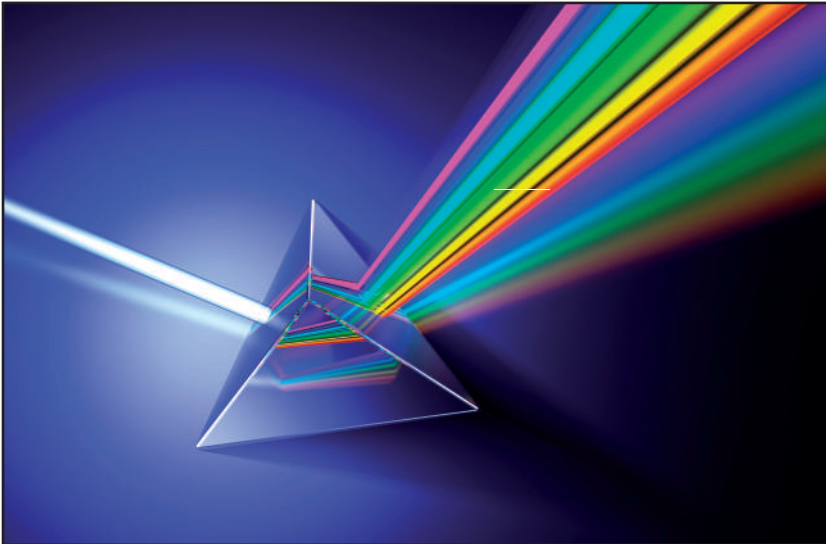
# KHATOD

Imaging & Sensor Lenses

During its 35-year history Khatod has committed to developing high-end optical solutions and guaranteeing top-quality technical support.

In addition to an extensive range of standard optics, Khatod's qualified team supports its partners in the development of customized solutions specifically tailored to their needs. Every project is followed from the initial design and all along the product processing and mass production.

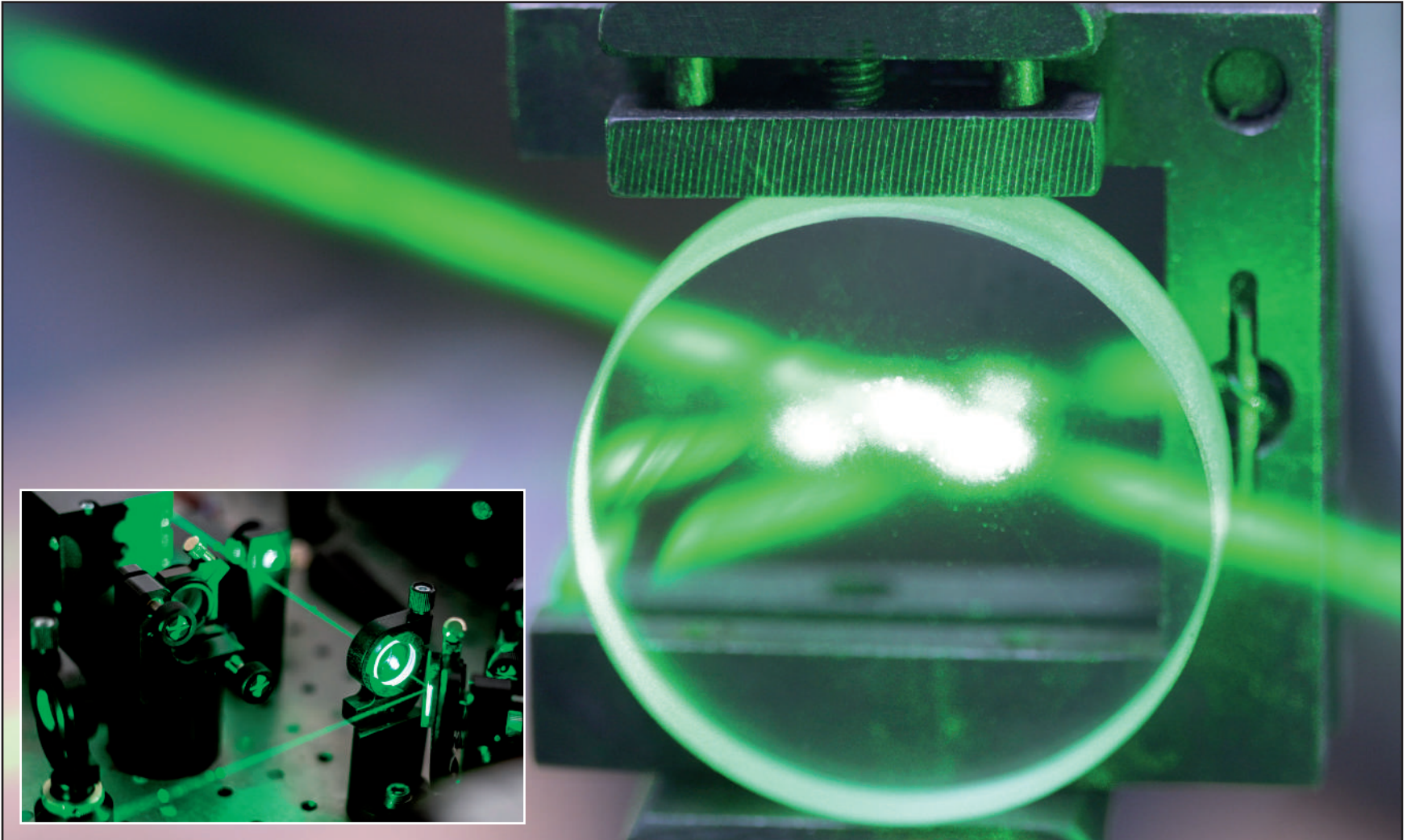
Khatod's range of optics allows to achieve a twofold result:



- Collimate the radiation from different sources such as LEDs, laser diodes and VICSELS.
- Focus the radiation collected on receivers, like photodiodes and linear CCDs.

The main advantage stands in the possibility of engineering both the optical and the mechanical part in a single component.

Thanks to the extensive selection of materials we are able to work with a wide range of frequencies, covering from UV to the near-infrared.

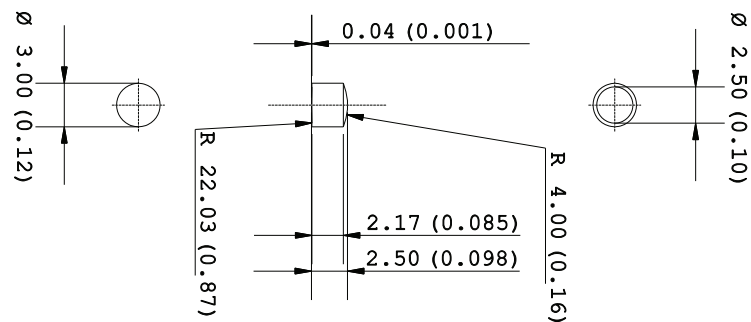


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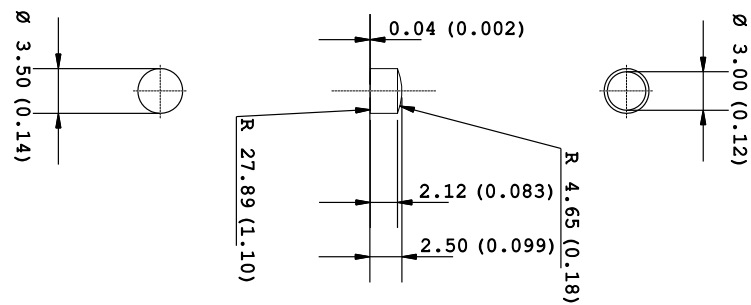
## KEB030 Biconvex Lenses Ø 3,00 mm.

Code	KEB03001B	KEB03003B	KEB03004B	KEB03006B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	3,00	3,00	3,00	3,00
d (mm)	2,5	2,5	2,5	2,5
S (mm)	0,25	0,25	0,25	0,25
t (mm)	2,50	2,50	2,50	2,50
h (mm)	2,17	2,17	2,17	2,17
Lambda (nm)	550	850	550	380
EFFL (mm)	8,1	8,4	8,3	8,0
BFL (mm)	7,6	7,8	7,8	7,6



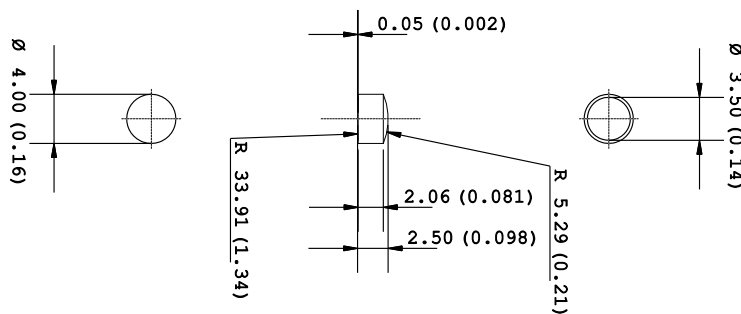
## KEB035 Biconvex Lenses Ø 3,50 mm.

Code	KEB03503B	KEB03504B	KEB03506B
Material	PC IR	PMMA	PMMA UV
D (mm)	3,50	3,50	3,50
d (mm)	3,00	3,00	3,00
S (mm)	0,25	0,25	0,25
t (mm)	2,50	2,50	2,50
h (mm)	2,12	2,12	2,12
Lambda (nm)	850	550	380
EFFL (mm)	8,9	10,2	9,9
BFL (mm)	7,8	8,5	8,2



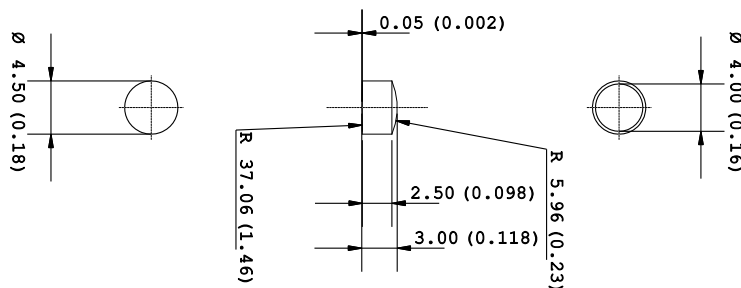
## KEB040 Biconvex Lenses Ø 4,00 mm.

Code	KEB04001B	KEB04003B	KEB04004B	KEB04006B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	4,00	4,00	4,00	4,00
d (mm)	3,5	3,5	3,5	3,5
S (mm)	0,25	0,25	0,25	0,25
t (mm)	2,50	2,50	2,50	2,50
h (mm)	2,06	2,06	2,06	2,06
Lambda (nm)	550	850	550	380
EFFL (mm)	10,3	10,6	11,4	11,0
BFL (mm)	8,6	8,8	9,5	9,2



## KEB045 Biconvex Lenses Ø 4,50 mm.

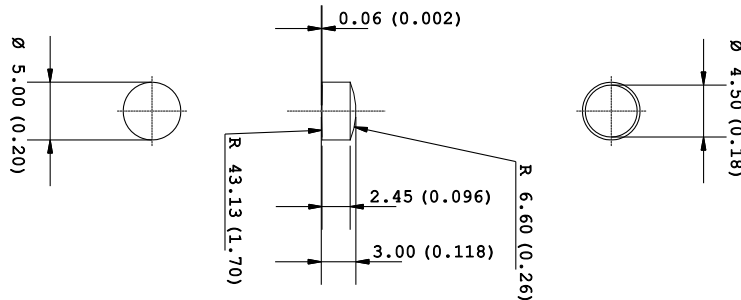
Code	KEB04501B	KEB04503B	KEB04504B	KEB04506B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	4,50	4,50	4,50	4,50
d (mm)	4,00	4,00	4,00	4,00
S (mm)	0,25	0,25	0,25	0,25
t (mm)	3,00	3,00	3,00	3,00
h (mm)	2,50	2,50	2,50	2,50
Lambda (nm)	550	850	550	380
EFFL (mm)	12,3	12,7	11,9	11,5
BFL (mm)	9,9	10,3	10,5	10,2





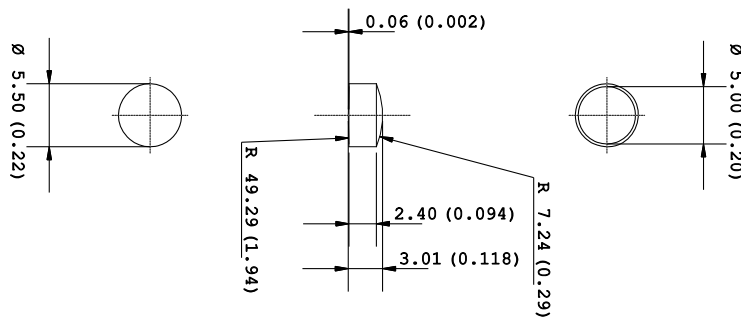
## KEB050 Biconvex Lenses Ø 5,00 mm.

Code	KEB05001B	KEB05003B
Material	PC	PC IR
D (mm)	5,00	5,00
d (mm)	4,50	4,50
S (mm)	0,25	0,25
t (mm)	3,00	3,00
h (mm)	2,45	2,45
Lambda (nm)	550	850
EFFL (mm)	13,7	14,1
BFL (mm)	12,2	12,6



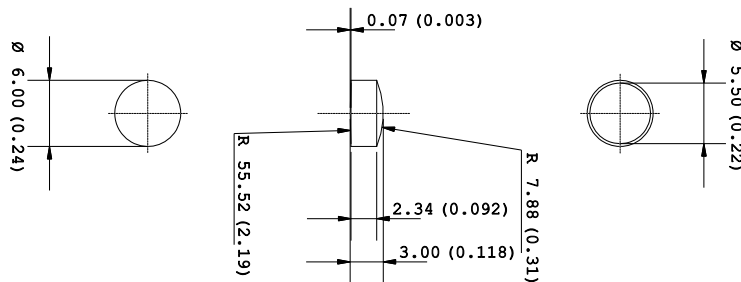
## KEB055 Biconvex Lenses Ø 5,50 mm.

Code	KEB05501B	KEB05503B	KEB05504B	KEB05506B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	5,50	5,50	5,50	5,50
d (mm)	5,00	5,00	5,00	5,00
S (mm)	0,25	0,25	0,25	0,25
t (mm)	3,00	3,00	3,00	3,00
h (mm)	2,40	2,40	2,40	2,40
Lambda (nm)	550	850	550	380
EFFL (mm)	13,0	13,4	14,5	14,0
BFL (mm)	11,3	11,6	12,9	12,5



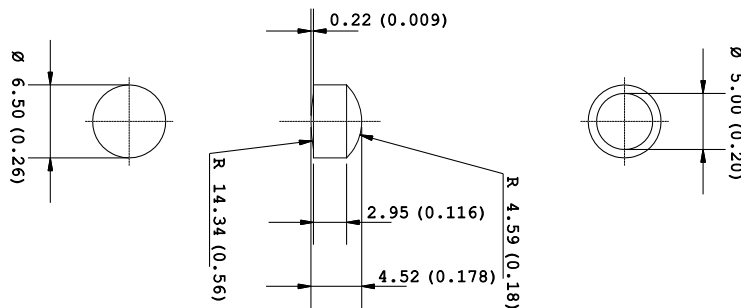
## KEB060 Biconvex Lenses Ø 6,00 mm.

Code	KEB06001B	KEB06003B	KEB06004B	KEB06006B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	6,00	6,00	6,00	6,00
d (mm)	5,50	5,50	5,50	5,50
S (mm)	0,25	0,25	0,25	0,25
t (mm)	3,00	3,00	3,00	3,00
h (mm)	2,34	2,34	2,34	2,34
Lambda (nm)	550	850	550	380
EFFL (mm)	13,7	14,1	15,2	14,7
BFL (mm)	12,3	12,6	14,2	13,8



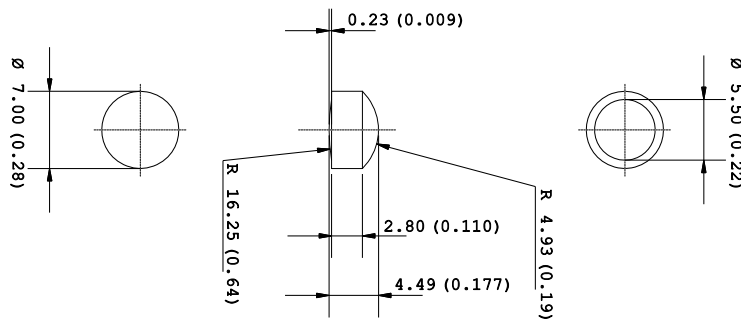
## KEB065 Biconvex Lenses Ø 6,50 mm.

Code	KEB06501B	KEB06503B	KEB06504B	KEB06506B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	6,50	6,50	6,50	6,50
d (mm)	5,00	5,00	5,00	5,00
S (mm)	0,75	0,75	0,75	0,75
t (mm)	4,50	4,50	4,50	4,50
h (mm)	2,95	2,95	2,95	2,95
Lambda (nm)	550	850	550	380
EFFL (mm)	7,9	8,2	7,5	7,2
BFL (mm)	6,8	7,0	6,4	6,2



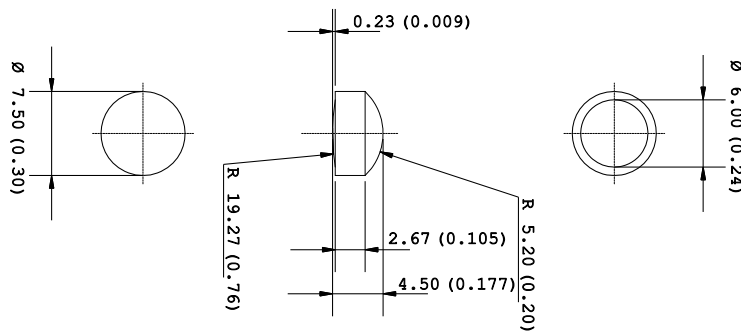
## KEB070 Biconvex Lenses Ø 7,00 mm.

Code	KEB07001B	KEB07003B	KEB07004B	KEB07006B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	7,00	7,00	7,00	7,00
d (mm)	5,50	5,50	5,50	5,50
S (mm)	0,75	0,75	0,75	0,75
t (mm)	4,50	4,50	4,50	4,50
h (mm)	2,80	2,80	2,80	2,80
Lambda (nm)	550	850	550	380
EFFL (mm)	9,0	9,3	9,2	8,9
BFL (mm)	7,3	7,6	7,7	7,4



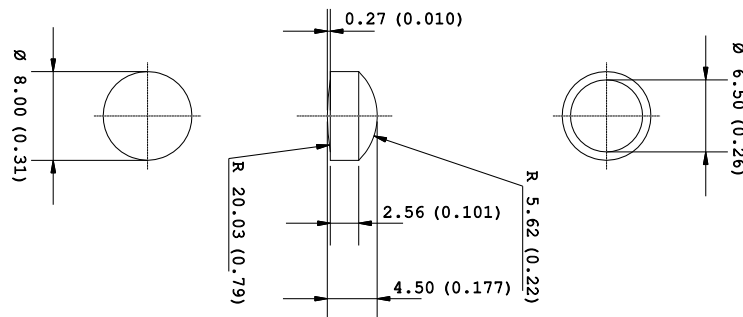
## KEB075 Biconvex Lenses Ø 7,50 mm.

Code	KEB07501B	KEB07503B	KEB07504B	KEB07506B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	7,50	7,50	7,50	7,50
d (mm)	6,00	6,00	6,00	6,00
S (mm)	0,75	0,75	0,75	0,75
t (mm)	4,50	4,50	4,50	4,50
h (mm)	2,67	2,67	2,67	2,67
Lambda (nm)	550	850	550	380
EFFL (mm)	9,5	9,8	13,0	12,6
BFL (mm)	8,5	8,8	11,3	11,0



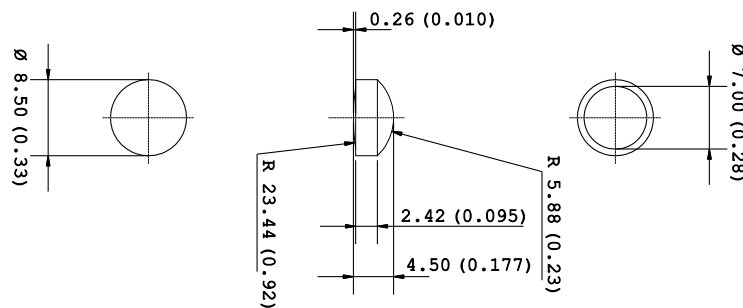
## KEB080 Biconvex Lenses Ø 8,00 mm.

Code	KEB08001B	KEB08003B	KEB08004B	KEB08006B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	8,00	8,00	8,00	8,00
d (mm)	6,50	6,50	6,50	6,50
S (mm)	0,75	0,75	0,75	0,75
t (mm)	4,50	4,50	4,50	4,50
h (mm)	2,56	2,56	2,56	2,56
Lambda (nm)	550	850	550	380
EFFL (mm)	8,5	8,8	10,4	10,1
BFL (mm)	6,8	7,1	8,9	8,6



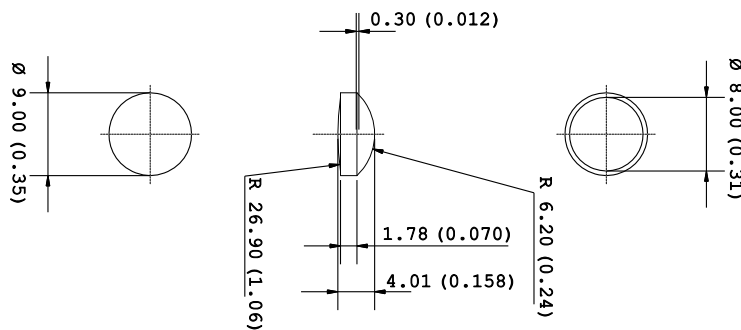
## KEB085 Biconvex Lenses Ø 8,50 mm.

Code	KEB08501B	KEB08503B	KEB08504B	KEB08506B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	8,50	8,50	8,50	8,50
d (mm)	7,00	7,00	7,00	7,00
S (mm)	0,75	0,75	0,75	0,75
t (mm)	4,50	4,50	4,50	4,50
h (mm)	2,42	2,42	2,42	2,42
Lambda (nm)	550	850	550	380
EFFL (mm)	9,1	9,4	10,0	9,7
BFL (mm)	7,9	8,2	8,9	8,6



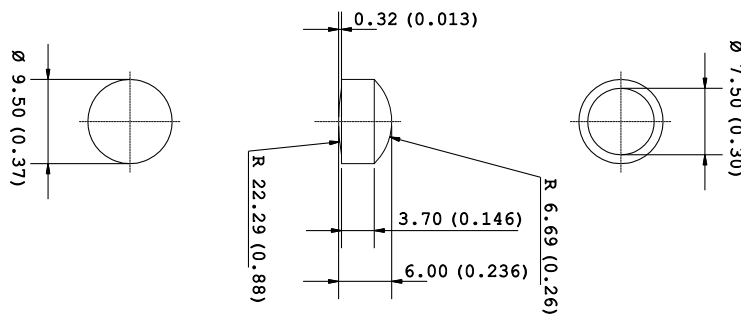
## KEB090 Biconvex Lenses Ø 9,00 mm.

Code	KEB09001B	KEB09003B	KEB09004B	KEB09006B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	9,00	9,00	9,00	9,00
d (mm)	8,00	8,00	8,00	8,00
S (mm)	0,50	0,50	0,50	0,50
t (mm)	4,00	4,00	4,00	4,00
h (mm)	1,78	1,78	1,78	1,78
Lambda (nm)	550	850	550	380
EFFL (mm)	11,5	11,9	12,6	12,2
BFL (mm)	9,0	9,3	9,9	9,6



## KEB095 Biconvex Lenses Ø 9,50 mm.

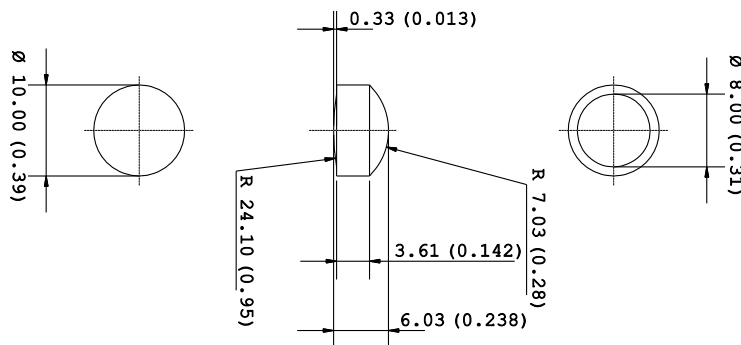
Code	KEB09501B	KEB09503B	KEB09504B	KEB09506B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	9,50	9,50	9,50	9,50
d (mm)	7,50	7,50	7,50	7,50
S (mm)	1,00	1,00	1,00	1,00
t (mm)	6,00	6,00	6,00	6,00
h (mm)	3,70	3,70	3,70	3,70
Lambda (nm)	550	850	550	380
EFFL (mm)	10,8	11,1	11,3	10,9
BFL (mm)	7,3	7,5	9,2	8,9





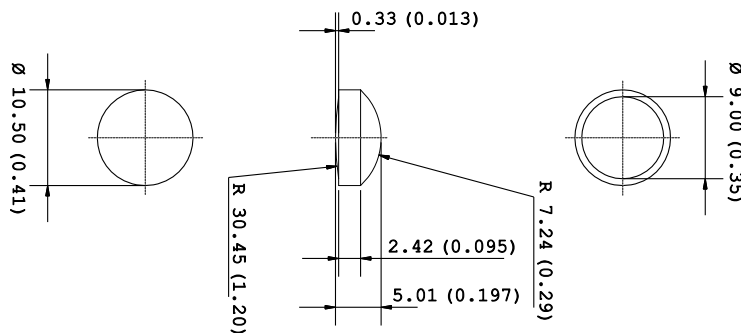
**KEB100 Biconvex Lenses Ø 10,00 mm.**

Code	KEB10001B	KEB10003B	KEB10004B	KEB10006B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	10,00	10,00	10,00	10,00
d (mm)	8,00	8,00	8,00	8,00
S (mm)	1,00	1,00	1,00	1,00
t (mm)	6,00	6,00	6,00	6,00
h (mm)	3,61	3,61	3,61	3,61
Lambda (nm)	550	850	550	380
EFFL (mm)	13,1	13,5	11,6	11,2
BFL (mm)	11,8	12,2	9,7	9,4



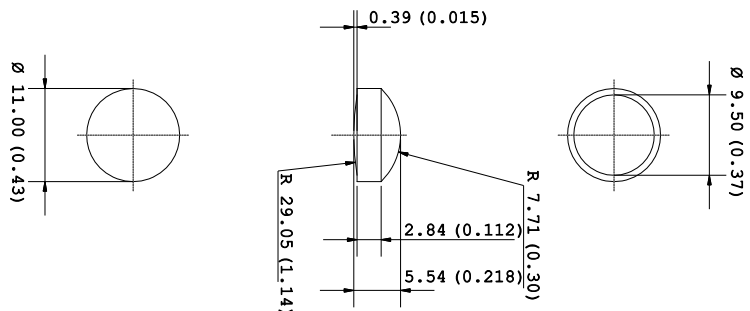
**KEB105 Biconvex Lenses Ø 10,50 mm.**

Code	KEB10501B	KEB10503B	KEB10504B	KEB10506B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	10,50	10,50	10,50	10,50
d (mm)	9,00	9,00	9,00	9,00
S (mm)	0,75	0,75	0,75	0,75
t (mm)	5,00	5,00	5,00	5,00
h (mm)	2,42	2,42	2,42	2,42
Lambda (nm)	550	850	550	380
EFFL (mm)	11,9	12,3	12,4	12,0
BFL (mm)	10,2	10,6	10,5	10,1



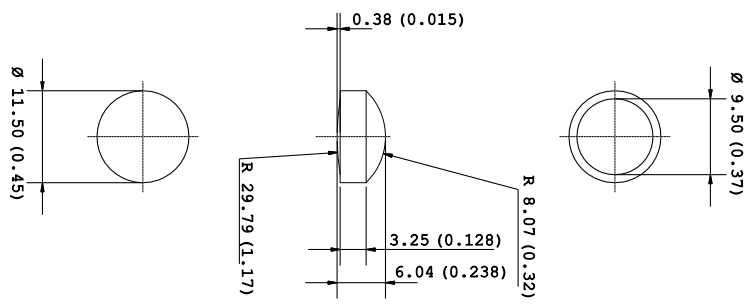
**KEB110 Biconvex Lenses Ø 11,00 mm.**

Code	KEB11001B	KEB11003B	KEB11004B	KEB11006B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	11,00	11,00	11,00	11,00
d (mm)	9,50	9,50	9,50	9,50
S (mm)	0,75	0,75	0,75	0,75
t (mm)	5,50	5,50	5,50	5,50
h (mm)	2,84	2,84	2,84	2,84
Lambda (nm)	550	850	550	380
EFFL (mm)	11,8	12,2	13,4	13,0
BFL (mm)	10,0	10,3	12,3	11,9



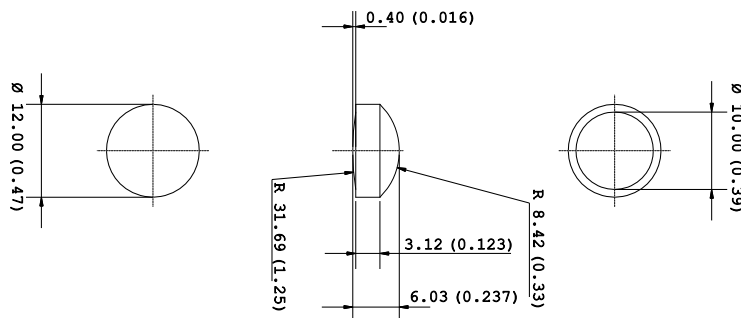
**KEB115 Biconvex Lenses Ø 11,50 mm.**

Code	KEB11501B	KEB11503B	KEB11504B	KEB11506B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	11,50	11,50	11,50	11,50
d (mm)	9,50	9,50	9,50	9,50
S (mm)	1,00	1,00	1,00	1,00
t (mm)	6,00	6,00	6,00	6,00
h (mm)	3,25	3,25	3,25	3,25
Lambda (nm)	550	850	550	380
EFFL (mm)	12,3	12,7	14,1	13,6
BFL (mm)	10,8	11,1	13,0	12,5



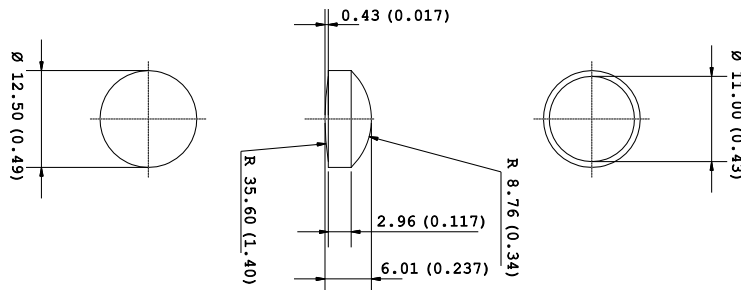
## KEB120 Biconvex Lenses Ø 12,00 mm.

Code	KEB12001B	KEB12003B	KEB12004B	KEB12006B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	12,00	12,00	12,00	12,00
d (mm)	10,00	10,00	10,00	10,00
S (mm)	1,00	1,00	1,00	1,00
t (mm)	6,00	6,00	6,00	6,00
h (mm)	3,12	3,12	3,12	3,12
Lambda (nm)	550	850	550	380
EFFL (mm)	12,7	13,1	14,7	14,2
BFL (mm)	11,4	11,8	12,2	11,8



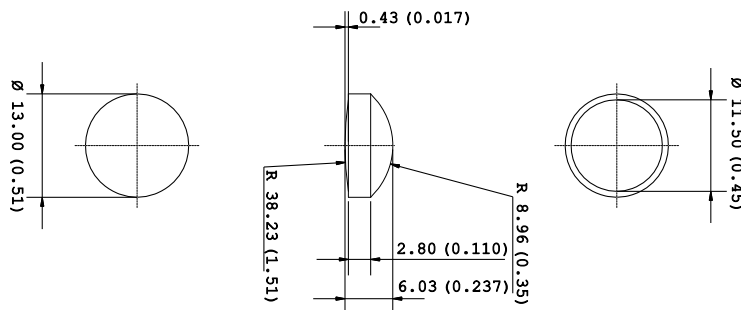
## KEB125 Biconvex Lenses Ø 12,50 mm.

Code	KEB12501B	KEB12503B	KEB12504B	KEB12506B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	12,50	12,50	12,50	12,50
d (mm)	11,00	11,00	11,00	11,00
S (mm)	0,75	0,75	0,75	0,75
t (mm)	6,00	6,00	6,00	6,00
h (mm)	2,96	2,96	2,96	2,96
Lambda (nm)	550	850	550	380
EFFL (mm)	14,5	15,0	14,1	13,6
BFL (mm)	13,4	13,9	12,4	12,0



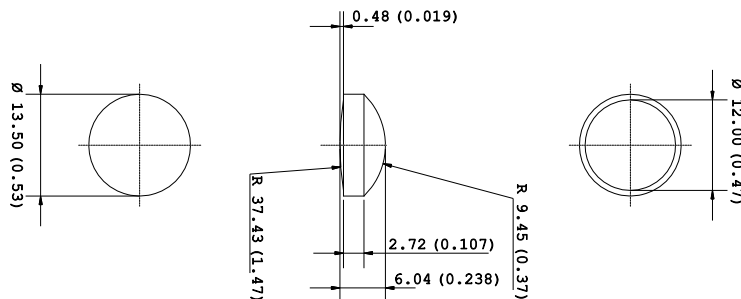
**KEB130 Biconvex Lenses Ø 13,00 mm.**

Code	KEB13001B	KEB13003B	KEB13004B	KEB13006B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	13,00	13,00	13,00	13,00
d (mm)	11,50	11,50	11,50	11,50
S (mm)	0,75	0,75	0,75	0,75
t (mm)	6,00	6,00	6,00	6,00
h (mm)	2,80	2,80	2,80	2,80
Lambda (nm)	550	850	550	380
EFFL (mm)	13,5	13,9	15,8	15,3
BFL (mm)	12,2	12,6	12,9	12,4



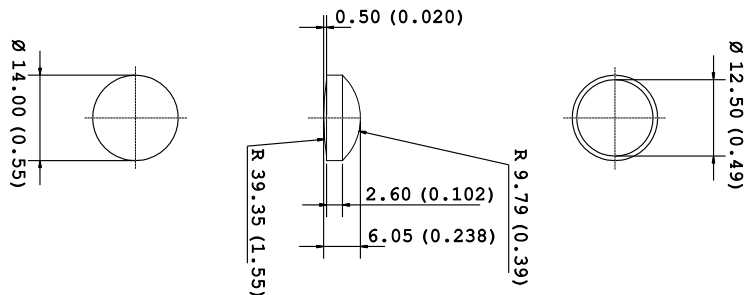
**KEB135 Biconvex Lenses Ø 13,50 mm.**

Code	KEB13501B	KEB13503B	KEB13504B	KEB13506B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	13,50	13,50	13,50	13,50
d (mm)	12,00	12,00	12,00	12,00
S (mm)	0,75	0,75	0,75	0,75
t (mm)	6,00	6,00	6,00	6,00
h (mm)	2,72	2,72	2,72	2,72
Lambda (nm)	550	850	550	380
EFFL (mm)	14,5	15,0	16,1	15,6
BFL (mm)	13,0	13,4	13,8	13,3



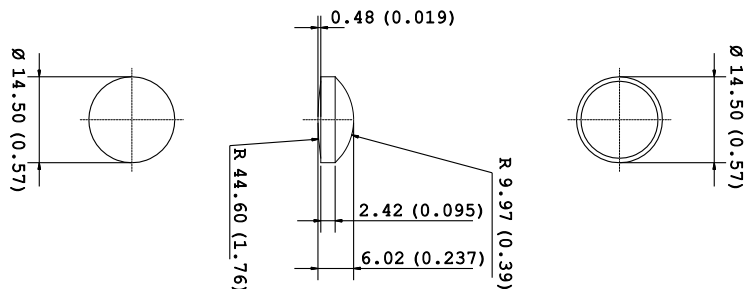
## KEB140 Biconvex Lenses Ø 14,00 mm.

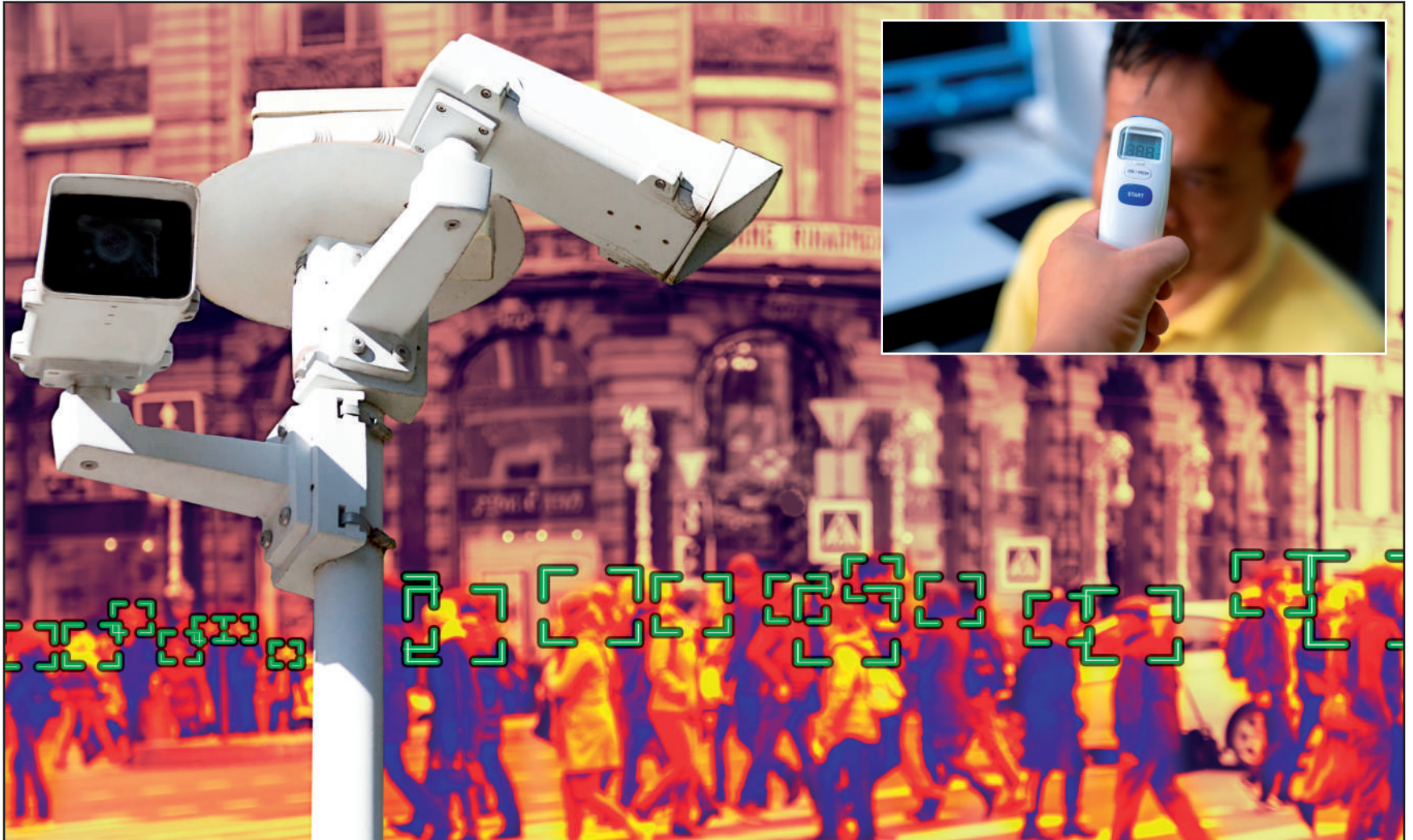
Code	KEB14001B	KEB14003B	KEB14004B	KEB14006B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	14,00	14,00	14,00	14,00
d (mm)	12,50	12,50	12,50	12,50
S (mm)	0,75	0,75	0,75	0,75
t (mm)	6,00	6,00	6,00	6,00
h (mm)	2,60	2,60	2,60	2,60
Lambda (nm)	550	850	550	380
EFFL (mm)	16,7	17,2	17,1	16,5
BFL (mm)	13,4	13,9	15,3	14,7



## KEB145 Biconvex Lenses Ø 14,50 mm.

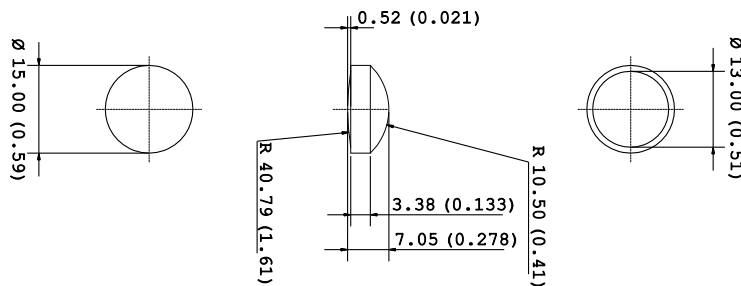
Code	KEB14501B	KEB14503B	KEB14504B	KEB14506B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	14,50	14,50	14,50	14,50
d (mm)	13,00	13,00	13,00	13,00
S (mm)	0,75	0,75	0,75	0,75
t (mm)	6,00	6,00	6,00	6,00
h (mm)	2,42	2,42	2,42	2,42
Lambda (nm)	550	850	550	380
EFFL (mm)	16,1	16,6	17,1	16,5
BFL (mm)	14,1	14,6	14,9	14,4





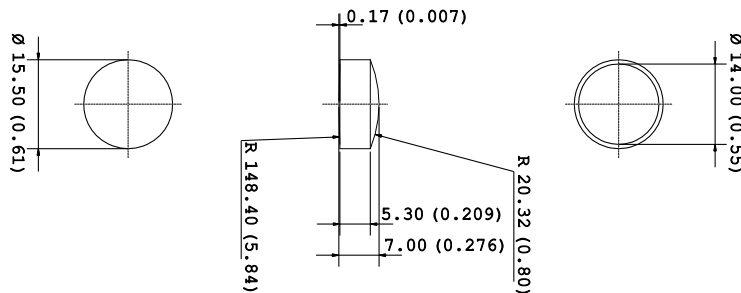
**KEB150 Biconvex Lenses Ø 15,00 mm.**

Code	KEB15001B	KEB15003B	KEB15004B	KEB15006B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	15,00	15,00	15,00	15,00
d (mm)	13,00	13,00	13,00	13,00
S (mm)	1,00	1,00	1,00	1,00
t (mm)	7,00	7,00	7,00	7,00
h (mm)	3,38	3,38	3,38	3,38
Lambda (nm)	550	850	550	380
EFFL (mm)	15,6	16,1	17,2	16,6
BFL (mm)	14,4	14,9	15,5	15,0



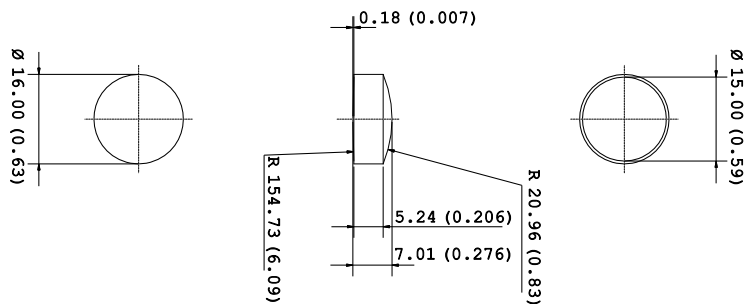
**KEB155 Biconvex Lenses Ø 15,50 mm.**

Code	KEB15501B	KEB15503B
Material	PC	PC IR
D (mm)	15,50	15,50
d (mm)	14,00	14,00
S (mm)	0,75	0,75
t (mm)	7,00	7,00
h (mm)	5,30	5,30
Lambda (nm)	550	850
EFFL (mm)	33,6	34,7
BFL (mm)	30,3	31,3



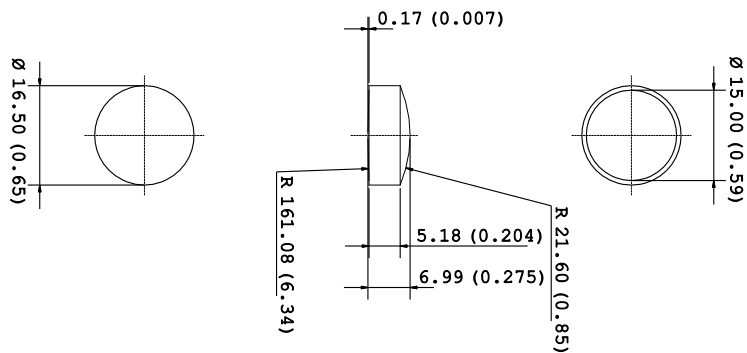
**KEB160 Biconvex Lenses Ø 16,00 mm.**

Code	KEB16001B	KEB16003B	KEB16004B	KEB16006B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	16,00	16,00	16,00	16,00
d (mm)	15,00	15,00	15,00	15,00
S (mm)	0,50	0,50	0,50	0,50
t (mm)	7,00	7,00	7,00	7,00
h (mm)	5,24	5,24	5,24	5,24
Lambda (nm)	550	850	550	380
EFFL (mm)	34,2	35,3	40,3	39,0
BFL (mm)	31,5	32,5	38,2	37,0



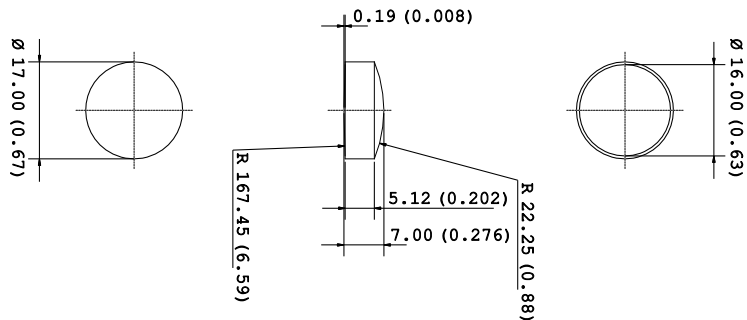
**KEB165 Biconvex Lenses Ø 16,5 mm.**

Code	KEB16501B	KEB16503B	KEB16504B	KEB16506B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	16,50	16,50	16,50	16,50
d (mm)	15,00	15,00	15,00	15,00
S (mm)	0,75	0,75	0,75	0,75
t (mm)	7,00	7,00	7,00	7,00
h (mm)	5,18	5,18	5,18	5,18
Lambda (nm)	550	850	550	380
EFFL (mm)	34,0	35,1	36,5	35,3
BFL (mm)	31,3	32,3	34,2	33,0



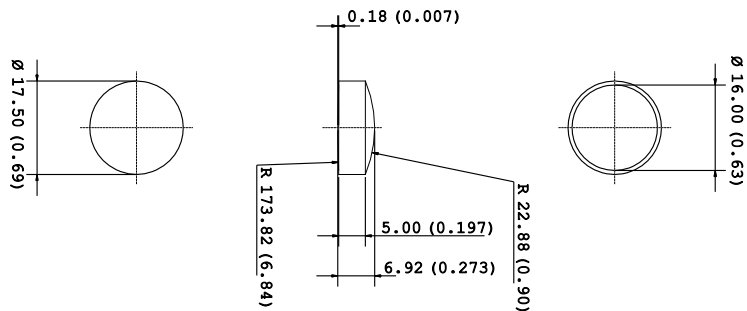
**KEB170 Biconvex Lenses Ø 17,00 mm.**

Code	KEB17001B	KEB17003B	KEB17004B	KEB17006B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	17,00	17,00	17,00	17,00
d (mm)	16,00	16,00	16,00	16,00
S (mm)	0,50	0,50	0,50	0,50
t (mm)	7,00	7,00	7,00	7,00
h (mm)	5,12	5,12	5,12	5,12
Lambda (nm)	550	850	550	380
EFFL (mm)	38,1	39,3	38,4	37,1
BFL (mm)	34,7	35,8	37,0	35,8



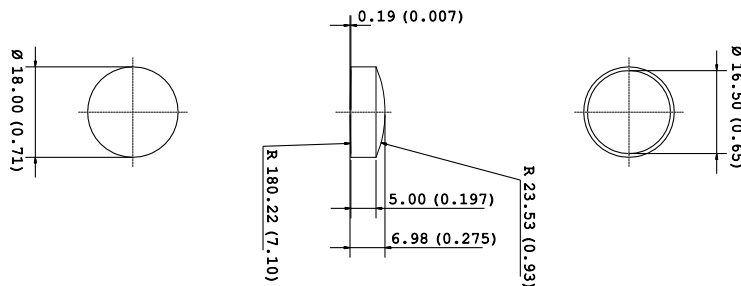
**KEB175 Biconvex Lenses Ø 17,50 mm.**

Code	KEB17501B	KEB17503B	KEB17504B	KEB17506B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	17,50	17,50	17,50	17,50
d (mm)	16,00	16,00	16,00	16,00
S (mm)	0,75	0,75	0,75	0,75
t (mm)	7,00	7,00	7,00	7,00
h (mm)	5,00	5,00	5,00	5,00
Lambda (nm)	550	850	550	380
EFFL (mm)	36,0	37,1	39,1	37,8
BFL (mm)	33,5	34,5	37,6	36,3



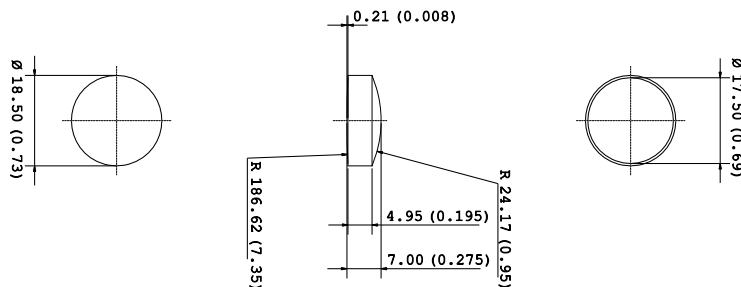
## KEB180 Biconvex Lenses Ø 18,00 mm.

Code	KEB18001B	KEB18003B	KEB18004B	KEB18006B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	18,00	18,00	18,00	18,00
d (mm)	16,50	16,50	16,50	16,50
S (mm)	0,75	0,75	0,75	0,75
t (mm)	7,00	7,00	7,00	7,00
h (mm)	5,00	5,00	5,00	5,00
Lambda (nm)	550	850	550	380
EFFL (mm)	37,1	38,3	44,7	43,2
BFL (mm)	34,1	35,2	40,6	39,2



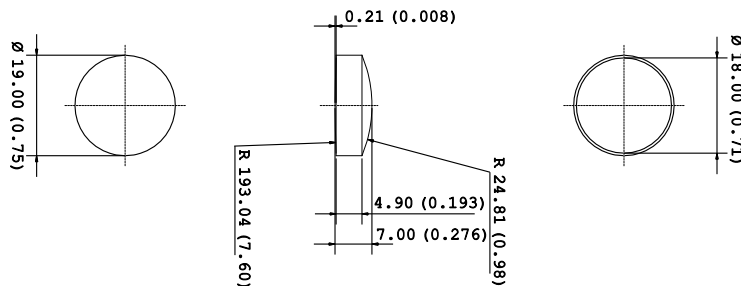
## KEB185 Biconvex Lenses Ø 18,50 mm.

Code	KEB18501B	KEB18503B	KEB18504B	KEB18506B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	18,50	18,50	18,50	18,50
d (mm)	17,50	17,50	17,50	17,50
S (mm)	0,50	0,50	0,50	0,50
t (mm)	7,00	7,00	7,00	7,00
h (mm)	4,95	4,95	4,95	4,95
Lambda (nm)	550	850	550	380
EFFL (mm)	38,3	39,5	43,9	42,4
BFL (mm)	35,3	36,4	40,8	39,4



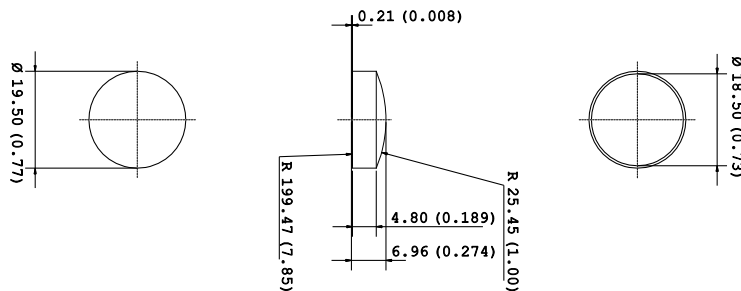
**KEB190 Biconvex Lenses Ø 19,00 mm.**

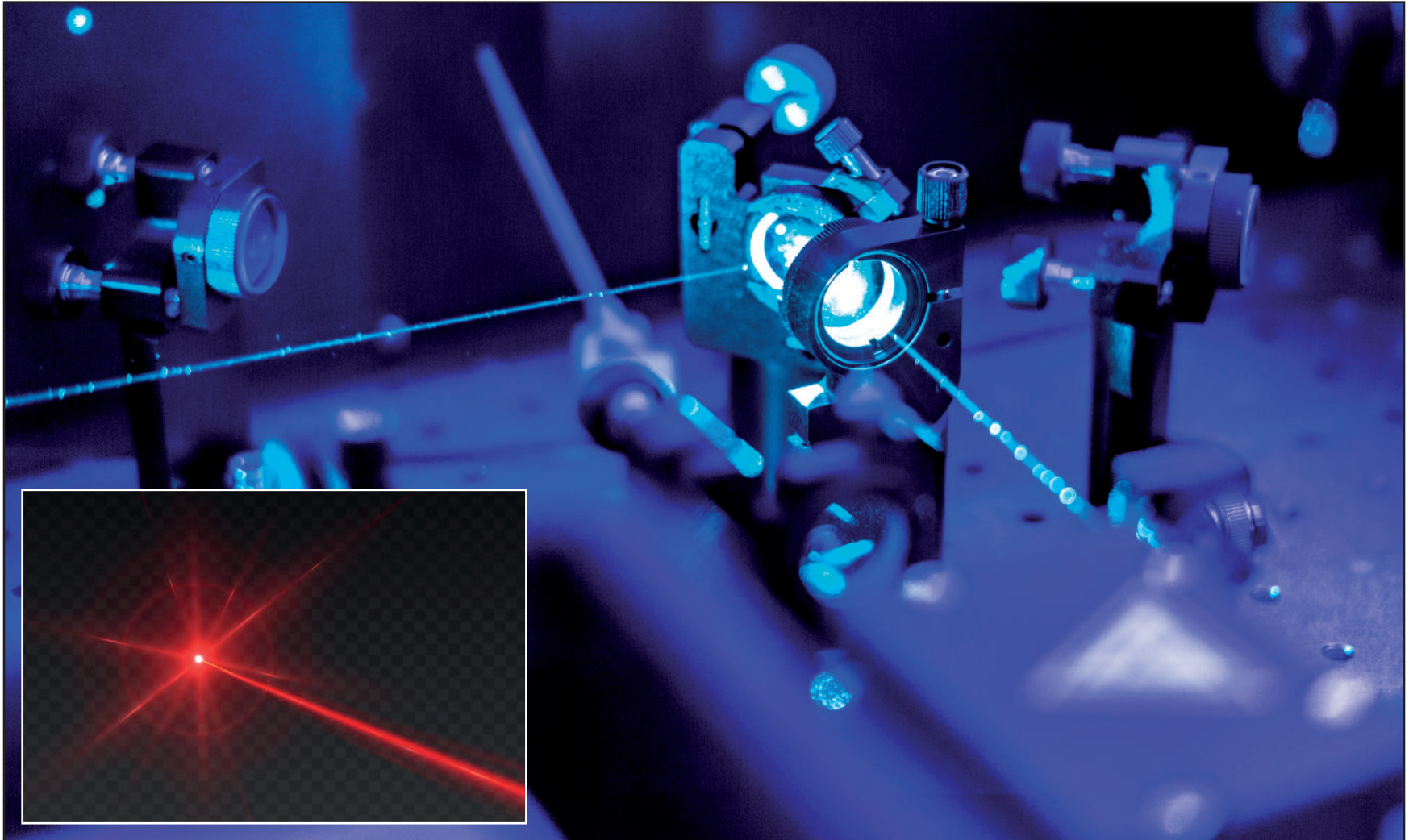
Code	KEB19001B	KEB19003B	KEB19004B	KEB19006B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	19,00	19,00	19,00	19,00
d (mm)	18,00	18,00	18,00	18,00
S (mm)	0,50	0,50	0,50	0,50
t (mm)	7,00	7,00	7,00	7,00
h (mm)	4,90	4,90	4,90	4,90
Lambda (nm)	550	850	550	380
EFFL (mm)	38,1	39,3	42,5	41,1
BFL (mm)	34,4	35,5	40,7	39,3



**KEB195 Biconvex Lenses Ø 19,50 mm.**

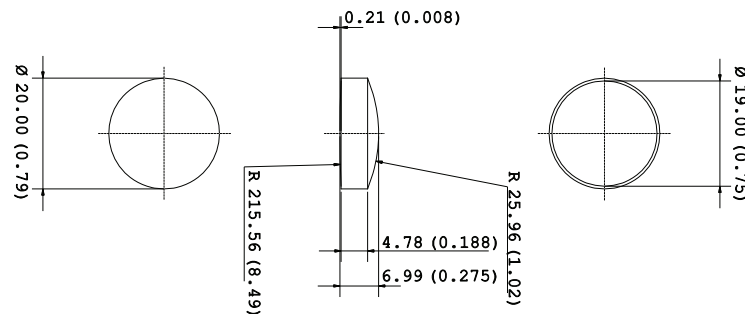
Code	KEB19501B	KEB19503B	KEB19504B	KEB19506B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	19,50	19,50	19,50	19,50
d (mm)	18,50	18,50	18,50	18,50
S (mm)	0,50	0,50	0,50	0,50
t (mm)	7,00	7,00	7,00	7,00
h (mm)	4,80	4,80	4,80	4,80
Lambda (nm)	550	850	550	380
EFFL (mm)	40,5	41,8	44,3	42,8
BFL (mm)	36,7	37,9	42,4	41,0





**KEB200 Biconvex Lenses Ø 20,00 mm.**

Code	KEB20001B	KEB20003B	KEB20004B	KEB20006B
Material	PC	PC IR	PMMA	PMMA UV
D (mm)	20,00	20,00	20,00	20,00
d (mm)	19,00	19,00	19,00	19,00
S (mm)	0,50	0,50	0,50	0,50
t (mm)	7,00	7,00	7,00	7,00
h (mm)	4,78	4,78	4,78	4,78
Lambda (nm)	550	850	550	380
EFFL (mm)	41,4	42,7	45,6	44,1
BFL (mm)	37,6	38,8	42,4	41,0



		PC	PC IR	PMMA	PMMA UV
Transmission Factor for transparent material	%	89	-	92	-
Refractive index		1.586	1.586	1.49	1.49
Haze for transparent material	%	< 0.8	-	< 0.5	< 0.5
Tensile modulus	MPa	2400	2400	3300	3300
Yeld stress	MPa	65*	65*	77**	77**
Yeld strain	MPa	6.0*	6.0*	5.5**	5.5**
Glass transition temperature	°C	145	148	117	117
Temperature of deflection under load (1.8 Mpa)	°C	124	125	98	98
Temperature of deflection under load (0.45 Mpa)	°C	137	137	103	103
Density	Kg/m3	1200	1200	1190	1190

\* 50 mm/min

\*\* 5 mm/min

## Geometric Tolerance

**t**       $t \pm 0,05\%$

**R**       $R \pm 3\%$

**D**       $D \begin{matrix} +0,00 \\ -0,1 \end{matrix}$

**EFFL**     $EFFL \pm 5\%$

**BFL**       $BFL \pm 5\%$



# KHATOD

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